SCAMPER-Enabled Generative AI as a Catalyst for Product Innovation in Small and Medium Enterprises (SMEs)

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ABSTRACT

In the rapidly evolving digital economy, Small and Medium Enterprises (SMEs) face growing pressure to innovate while contending with limited financial and technical resources. This study explores the strategic integration of the SCAMPER creative thinking method with Generative Artificial Intelligence (GenAI) tools—such as ChatGPT, DALL·E, and Midjourney—as a novel approach to accelerate product innovation in resource-constrained SMEs. Using a mixed-methods approach, including a quantitative survey of over 100 Indonesian SME owners and a comprehensive literature review, the study identifies both the opportunities and the barriers surrounding this integration. Results indicate that while awareness of SCAMPER remains limited, interest in using GenAI for product development is exceptionally high, with 95% of respondents expressing willingness to adopt the method if guided by AI-powered prompts and templates. SWOT analysis reveals that GenAI-enabled SCAMPER is a low-cost, high-impact, and human-centered strategy that aligns well with the creative agility and adaptive culture of SMEs. The paper concludes with policy and design recommendations, including the development of microlearning modules, visual AI prompt repositories, and cross-sectoral partnerships to enhance adoption. This study contributes to bridging the gap in innovation frameworks accessible to SMEs in emerging markets and offers a replicable model for inclusive digital transformation.

Keywords: Generative AI; SCAMPER; SMEs; Product Innovation; Artificial Intelligence Adoption

1. INTRODUCTION

In the era of accelerated digitalisation, Small and Medium Enterprises (SMEs) are under increasing pressure to innovate rapidly and remain competitive in volatile markets. While large corporations enjoy access to sophisticated R&D infrastructures, SMEs often struggle with limited resources, constrained access to digital talent, and a lack of structured methodologies for innovation (Dwivedi et al., 2023). Product innovation, in particular, poses a unique challenge for SMEs due to its demands on creativity, speed-to-market, and relevance to rapidly evolving consumer preferences.

The emergence of Generative Artificial Intelligence (GenAI) offers a potential breakthrough in this regard. Tools such as ChatGPT, DALL·E, and Midjourney are capable of generating new product ideas, visual prototypes, marketing texts, and customer interaction scripts with minimal technical input. However, while GenAI excels at creating content, SMEs often require structured frameworks to channel this creativity into commercially viable products.

This paper proposes the integration of the SCAMPER method (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse) with GenAI as a low-cost, high-impact innovation strategy for SMEs. SCAMPER provides the structure; GenAI delivers the creative firepower. The study investigates the potential, perceptions, and barriers to adopting this combined approach through literature analysis and a quantitative survey conducted among 100+ SMEs in Indonesia.

2. RESEARCH METHODOLOGY

2.1 Research Design

This study employs a quantitative survey design, distributing a structured online questionnaire to SMEs across various industries in Indonesia. It integrates Likert-scale items that capture perceptions, readiness, and barriers related to AI and product innovation.

2.2 Data Collection

A total of 100+ SMEs participated in the survey. Respondents represented various sectors such as food & beverage, retail, fashion, manufacturing, and services. Data were collected via Google Forms and pre-processed using statistical tools for descriptive analysis.

2.3 Instrumentation

Key indicators of SCAMPER-related adoption were inferred through items such as:

- "I am aware of examples of GenAI in product and service innovation" (mean = 4.00)
- "I believe GenAI can enhance product innovation" (mean = 4.42)
- "I am interested in using GenAI in my business" (mean = 4.42)

2.4 Data Analysis

Descriptive statistics were used to assess SME perceptions, supported by thematic synthesis of literature. Findings were visualised and contextualised in light of the SCAMPER framework.

3. RESULT AND DISCUSSION

3.1 SME Readiness and SCAMPER Awareness

Although only 66% of respondents reported previous knowledge of SCAMPER, over 95% expressed strong interest in adopting it when it was introduced in the form of AI-assisted templates. This demonstrates that SCAMPER remains highly underutilised, but perceived as highly accessible when combined with AI.

3.2 Benefits of GenAI-SCAMPER Integration

Key advantages reported and cited in literature include:

- Faster prototyping (Wijayanti, 2022)
- More creative product variations
- Reduced dependency on in-house designers
- Rapid marketing material generation (Haenlein & Kaplan, 2019)

Practical uses included using ChatGPT to substitute and combine product features, or DALL·E to visualise packaging redesigns based on adapted functions or reversed product use cases.

3.3 Barriers to Adoption

Despite interest, several constraints persist:

- Lack of knowledge on prompt engineering
- Fear of creative "over-reliance" on AI
- Concerns about originality and intellectual property

3.4 Strategic Fit for Resource-Constrained SMEs: SWOT Analysis and Application

To evaluate the practicality and potential of integrating SCAMPER with Generative AI (GenAI) in SME product innovation, this study employed a SWOT analysis framework based on both survey findings and academic literature.

Table 1. SWOT Analysis: SCAMPER-Enabled GenAI in SME Product Innovation

Strengths	Weaknesses
High enthusiasm and willingness to learn AI (Avg. Likert 4.42)	Limited digital literacy among SME owners (Pongtambing et al., 2023)
Flexibility and agility in product iteration	Lack of in-house AI or technical teams
Creative freedom through GenAI tools like ChatGPT/DALL·E	Low awareness of structured innovation methods like SCAMPER (only ~66% awareness)
Opportunities	**Threats**
Increasing availability of free and low-cost GenAI tools (e.g., Canva AI, ChatGPT)	Risk of vendor lock-in for proprietary AI platforms
Government push for digitalisation of SMEs in ASEAN (OECD, 2023)	Unclear regulations regarding AI-generated content and IP rights
Growing demand for customised, innovative local products	Ethical concerns and trust gaps regarding AI usage in creative processes

Strategic Implications and Fit for SMEs: The above SWOT analysis shows that while there are substantial challenges, the strengths and opportunities outweigh the risks—making SCAMPER+GenAI not only viable but strategically fit for SMEs, especially those with limited resources.

Several implications emerge:

1. Microlearning as a Bridge to Digital Literacy
   With many respondents expressing high motivation but lacking technical confidence, modular training in prompt engineering, especially using the SCAMPER framework, can act as a low-barrier entry point for AI adoption.

2. Templates and Playbooks
    Given the shortage of technical personnel, SMEs benefit from ready-to-use prompt templates tailored to SCAMPER stages (e.g., "Substitute this product feature with…" or "Modify packaging with sustainability in mind"). These can be systematised in a digital toolkit or app.

3. Creative Prototyping Without Technical Teams
    Tools like Midjourney or Canva AI allow SMEs to visually test product ideas generated via SCAMPER + AI prompts. This supports fast ideation even in the absence of graphic designers or R&D teams.

4. Low-Risk Experimentation
    The combination allows for low-cost A/B testing of ideas. For example, using ChatGPT to rephrase product descriptions under the "Combine" stage or DALL·E to explore new visual branding via the "Modify" or "Reverse" lens.

5. Policy & Partnership Leverage
    The survey shows that 83% of SMEs would be more likely to adopt GenAI if training and success stories were made accessible. Hence, policy incentives, bootcamps, and public-private partnerships (e.g., between local governments, universities, and AI providers) become essential enablers.

6. Human-Centered & Contextualised Design
    Inspired by Steve Jobs' design thinking and HCD principles, the SCAMPER+AI model offers not just technological access, but a humanised pathway to innovation, aligning with SME values of customer closeness, practicality, and meaning.

In summary, the SCAMPER + GenAI integration presents a strategically sound, creatively empowering, and contextually relevant pathway for SMEs. By recognising both internal capabilities and external conditions through the

SWOT lens, this approach enables SMEs to leapfrog traditional innovation barriers and become agile players in the digital economy.

SCAMPER+GenAI requires no coding, expensive tools, or deep AI knowledge. This makes it an ideal innovation path for SMEs, provided that modular training, access to curated prompts, and real-world use cases are made available (Pongtambing et al., 2023).

4. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The integration of SCAMPER with Generative AI represents a powerful, scalable, and accessible strategy for product innovation in SMEs. With high levels of interest from SME owners and workers, this combined approach can bridge the innovation gap if deployed with the right training and support mechanisms.

4.2 Recommendations

- Microlearning Modules: Develop short, scenario-based training to teach prompt engineering for SCAMPER.

- AI-Toolkit for SMEs: Create templates for each SCAMPER category tailored for AI tools like ChatGPT, DALL·E, and Canva AI.

- Public-Private Collaboration: Encourage policy makers, tech firms, and universities to co-develop open-access innovation frameworks.

- Visual Prompt Repositories: Provide SMEs with pre-tested visual prompts and content generators based on sector (e.g. food, fashion, craft).

- SCAMPER+AI Bootcamps: Organise offline/online hybrid workshops for SMEs focusing on real case-building and AI testing.

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